

Rondout, N. Y.; Bellevue, Cincinnati, Demos, Mansfield, Milfordton, North Lewisburg, Pomeroy, Portsmouth, Sandusky, Sidney, Westerville, and West Milton, Ohio; Gate City, Okla.; Aqueduct, Blooming Grove, Confluence, East Mauch Chunk, Greensboro, Huntingdon, Lock Haven, Phoenixville, Quakertown, Wellsboro, West Chester, and West Newton, Pa.; Franklin, Milan, and Nashville, Tenn.; Arthur City and Red River City, Tex.; Dale Enterprise, Riverton, Stanardsville, Staunton, and Stephens City, Va.; Fairmont, Glenville, Grafton, Martinsburg, Morgantown, Parkersburg, Romney, Tannery, and Wheeling, W. Va.

10th, Huntingdon and Vincennes, Ind.; Hutchinson, Kans.; Burkesville, Edmonton, Greensburg, Harrodsburg, and Matlock, Ky.; Frederick, Md.; Cape Girardeau and Steelville, Mo.; Norfolk, Nebr.; Bakersville, N. C.; Caledonia, Canton, and Kenton, Ohio; Brookville, Johnstown, Parkers, Saltsburg, and Stoyestown, Pa.; Chattanooga and Springdale, Tenn.; Harpers Ferry and Spencer, W. Va. 11th, Richmond, Va.; Waukesha, Wis. 12th, Payette, Idaho. 14th, Horse Cove, N. C. 15th, Greeneville, Tenn.; Grouse Creek, Utah. 16th, Prescott, Ark.; Sheridan Lake and Walnut, Colo.; Congordia, Manhattan, Salina, and Wichita, Kans.; Canton and Princeton, Mo.; Kimball, Nebr.

17th, Aurora, Bushnell, Carlinsville, Galva, Griggsville, Quincy, and Springfield, Ill.; Lafayette, Ind.; Bonaparte, Delaware, Fort Madison, Iowa City, Mechanicsville, Monticello, Richland, and Washington, Iowa; Abilene, Atchison, Eldorado, Havensville, Independence, Leavenworth, Lebo, Marion, Minneapolis, Morse, Topeka, Wakefield, and Yates Center, Kans.; Appleton City, Arthur, Brunswick, Chilli-cothe, Clinton, Columbia, Conception, Dadeville, Darksville, East Lynne, Eldon, Farmersville, Fayette, Fox Creek, Glasgow, Glensted, Gorin, Grovedale, Harrisonville, Hastain, Hermann, Kansas City, Kidder, Lamonte, Lebanon, Lexington, Liberty, McCune, Mount Vernon, New Hartford, Oakfield, Oregon, Paris, Platte River, Saint Charles, Saint Joseph, Sedalia, Shelbina, Stellada, Van Cleve, Vermont, Warrenton, Wellsville, West Plains, Wheatland, and Whiteside, Mo.; Crete and Lincoln, Nebr.; Deseret, Utah; Baraboo, Cadiz, Fond du Lac, Neillsville, and Westfield, Wis.

18th, Carthage, Mo.; Wytheville, Va.; Portage, Wis. 19th, Fairmount, Ill.; Mount Sterling, Richmond, Shelby City, and South Forks, Ky.; Barren Creek Springs, Md.; Hart, Mich.; New Boston, Mo.; Bailey and Weldon, N. C.; Blacksburg, Big Stone Gap, Christiansburg, Lexington, and on mountains near Lynchburg, Va.; Nuttallburg, W. Va. 22d, Susanville, Cal.; Cooperstown, N. Y. 23d, Nevada City, Oleta, and Tehachapi, Cal.; Leonardtown and Solomons, Md.; Atlantic City and Egg Harbor City, N. J.; Mahoning, Pa.; Aberdeen, S. Dak.; Birdsnest, Norfolk, Saluda, Spottsville, Warsaw, and Weston, Va.

24th, Yreka, Cal.; Houston, Mo.; Haigler and Santee Agency, Nebr.; Freeport, Pa.; Block Island, R. I.; Oelrichs, S. Dak.; Cisco, Lake Park, Moab, Ogden, Parowan, Richfield,

and Snowville, Utah; Walla Walla, Wash. 25th, Georgetown and Grass Valley, Cal.; Lagrange and Oswego, Ill.; Blakeville and Hawkeye, Iowa; Burwell, Dunning, Ericson, and Springview, Nebr.; Gary, Kimball, Mellette, and Rosebud, S. Dak.; Charlottesville and Salem, Va.; Clallam Bay, Port Angeles, and Pysht, Wash.; Danville, W. Va.; Oconomowoc, Wis. 26th, Oregon, Ill.; Oskaloosa, Iowa; Irena, Mo.; Avon, Hot Springs, Lynchburg, and Mossier Ford, Va.; Olympia, Wash. 27th, New London, Conn.; Clinton, Iowa; Bedford City, Va. 28th, Dudley, Mass.; Falls Church and Marion, Va. 29th, Voluntown, Conn.; Fort Canby, Wash. 30th, River Vale, N. J.

## HAIL.

Description of the more severe hailstorms of the month is given under "Local storms." Hail was reported as follows: 1st, Arizona, Arkansas, and Illinois. 2d, New York. 4th, Ohio. 5th, Missouri and Montana. 6th, Texas. 8th, Texas. 9th, Delaware, Illinois, Maryland, and New Jersey. 10th, Maryland and Texas. 11th, New Mexico. 13th and 14th, Washington. 15th, North Carolina and Washington. 16th, Arkansas and Missouri. 17th, Arkansas, Illinois, and Missouri. 18th, North Carolina. 19th, New Jersey. 20th, North Carolina. 21st, Connecticut and New Jersey. 22d, Washington. 23d, California and Oregon. 24th, California, Missouri, New Mexico, Oregon, and Washington. 25th, Massachusetts, Nevada, Ohio, and Washington. 26th, Indiana and Missouri. 27th, Missouri. 28th, Arkansas, Oregon, and Washington. 29th and 30th, Arkansas.

## SLEET.

Description of the more severe sleetstorms is given under "Local storms." Sleet was reported as follows: 1st, Massachusetts and Utah. 2d, Maine, Massachusetts, and Vermont. 4th, Ohio and Wisconsin. 6th, Kentucky and North Dakota. 8th, Mississippi, New Jersey, and Texas. 9th, Arkansas, Kentucky, Maryland, Mississippi, New Jersey, Ohio, Pennsylvania, and Tennessee. 10th, Massachusetts, Ohio, Pennsylvania, and Virginia. 11th, Illinois, New York, Pennsylvania, and Wisconsin. 12th, Pennsylvania. 13th, Michigan. 14th, Michigan and Ohio. 16th, Missouri and Utah. 17th, Illinois, Iowa, Michigan, Mississippi, Missouri, and Wisconsin.

18th, Michigan, New York, Ohio, Pennsylvania, and Wisconsin. 19th, Maryland and Montana. 20th, Iowa. 21st, New York and Pennsylvania. 22d, Montana and South Dakota. 24th, Illinois, Iowa, Kansas, Missouri, Nebraska, Nevada, North Dakota, South Dakota, Utah, and West Virginia. 25th, Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Tennessee, Virginia, and Wisconsin. 26th, Indiana, Kentucky, Michigan, Minnesota, Missouri, Ohio, Virginia, and Wisconsin. 27th, Illinois, Indiana, Iowa, Michigan, Missouri, Ohio, Virginia, and Wisconsin. 28th, Iowa, Kansas, and Pennsylvania. 29th, Iowa, Massachusetts, Ohio, Pennsylvania, and Washington. 30th, Iowa and North Dakota.

## WINDS.

The prevailing winds for November, 1892, are shown on Chart II by arrows flying with the wind. In the middle Atlantic and New England states, the Ohio Valley and Tennessee, and the Missouri Valley the winds were generally from the northwest; in the south Atlantic states and the extreme northwest, from west to north; over the Florida Peninsula and the east Gulf states, from northwest to northeast; in the west Gulf states, from east to south; in the Lake region, on the northeast slope of the Rocky Mountains, and along the middle Pacific coast, from southwest to northwest; in

the upper Mississippi valley, over the middle plateau region, and on the north Pacific coast, from southeast to southwest; on the middle and southeast slopes of the Rocky Mountains, from south to west; along the south Pacific coast, from west to northwest; and over the southern plateau region, variable.

## HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 4th, 50, ne., at Chicago, Ill. 5th, 52, nw., at Woods Holl,

Mass. 6th, 60, nw., at Rapid City, S. Dak.; 52, nw., at Kearney, Nebr.; 50, nw., at Bismarck, N. Dak. 7th, 55, sw., at Chicago, Ill. 8th, 50, sw., at Buffalo, N. Y. 11th, 50, sw., at Fort Canby, Wash. 12th, 56, sw., at Helena, Mont. 13th, 60, w., at Fort Canby, Wash. 14th, 99, w., at Pikes Peak, Colo.; 56, s., at Amarillo, Tex. 15th, 50, n., at Amarillo, Tex. 16th, 60, se., at Block Island, R. I.; 58, w., at Amarillo, Tex.; 50, nw., at Cheyenne, Wyo.; 50, nw., at El Paso, Tex.

17th, 88, nw., at Pikes Peak, Colo.; 60, se., at Lexington, Ky.; 56, nw., at Kearney, Nebr.; 54, sw., at Cairo, Ill.; 50, s., at Tatoosh Island, Wash.; 50, sw., at Memphis, Tenn. 18th, 60, e., at Tatoosh Island, Wash.; 56, s., at Fort Canby, Wash.; 53, sw., at Kittyhawk, N. C.; 52, s., at Northfield, Vt.; 52, se., at Albany, N. Y.; 50, sw., at Detroit, Mich.; 50, w., at Hatteras, N. C. 19th, 84, w., at Pikes Peak, Colo.; 56, s., at Fort Canby, Wash.; 52, s., at Tatoosh Island, Wash. 20th, 90, w., at Pikes Peak, Colo.; 54, w., at Huron, S. Dak.; 50, nw., at Kearney, Nebr. 22d, 66, s., at Fort Canby, Wash.; 50, e., at Tatoosh Island, Wash. 23d, 52, sw., at Winnemucca, Nev.; 50, nw., at Kittyhawk, N. C.

24th, 80, w., at Pikes Peak, Colo.; 50, sw., at Keeler, Cal. 25th, 80, w., at Pikes Peak, Colo.; 54, nw., at Kearney, Nebr. 27th, 90, w., at Pikes Peak, Colo.; 50, se., at Fort Canby, Wash.; 50, e., at Tatoosh Island, Wash. 28th, 84, w., at Pikes Peak, Colo.; 72, se., at Fort Canby, Wash.; 60, s., at Winnemucca, Nev.; 56, s., at Tatoosh Island, Wash.; 52, sw., at Cheyenne, Wyo.; 52, se., at San Francisco, Cal. 29th, 70, ne., at Block Island, R. I.; 62, s., at Winnemucca, Nev. 30th, 70, s., at Fort Canby, Wash.; 68, ne., at Block Island, R. I.; 61, e., at Tatoosh Island, Wash.; 60, s., at Winnemucca, Nev.; 56, se., at San Francisco, Cal.

#### LOCAL STORMS.

**1st.**—At Pueblo, Colo., rain changed to snow 9.55 a. m. Snow continued all day, the aggregate amount being estimated at 4 inches, a greater part of which melted on reaching the ground. A heavy wind and rain storm was reported at Marshall, Tex.

**5th.**—At Corpus Christi, Tex., a severe thunderstorm occurred in the evening; the wind reached a velocity of 42 miles per hour from the east, causing some damage. At Idaho Falls, Idaho, southeast winds reached a velocity of 48 miles per hour at 1.40 p. m.

**6th.**—Brisk to high southeast winds, with a heavy sea, and rain and snow prevailed at Grand Haven, Mich., in the afternoon and evening. A wind and snow storm prevailed over the Dakotas and eastern Montana. A tornado was reported on the coast about 10 miles below Galveston, Tex., at 5.45 a. m. The storm moved northeast, the path of destruction being 50 to 150 yards in width and 7 miles in length; a child was killed, and property was destroyed to the estimated value of \$10,000.

**7th.**—A destructive windstorm was reported in Monroe county, Ala., in the morning. At Buffalo, N. Y., light rain, with high southeast veering to southwest winds, prevailed; several large plate glass windows were blown in. At Detroit, Mich., a southwest gale continued during the day and night, an extreme velocity of 60 miles per hour being noted at 4.44 p. m.

**9th.**—Snow fell in the Western States, New York, and the mountains of Pennsylvania, Maryland, and Virginia.

**11th.**—High southwest winds and heavy sea were reported at Grand Haven, Mich. At Chicago, Ill., the water in the Chicago River was lowered 3 feet by high southwest wind.

**15th.**—Exceptionally heavy rain fell at New Haven, Conn. Heavy rain on the 15th and 16th caused a freshet in the Raritan River, New Jersey. High wind and heavy rain caused damage of a minor character at Baltimore, Md.

**16th.**—An easterly gale and heavy rain prevailed at Bos-

ton, Mass., in the morning. A severe storm prevailed along the Jersey coast. Severe storms occurred in the Southwest. At Steelville, Mo., a house was struck by lightning at night. At Carrollton, Mo., rain began on the 16th and changed to sleet and snow on the 17th, damaging electric wires. About 8 p. m. a tornado visited Boone county, Ark. The storm first appeared in the mountains 5 or 6 miles from Harrison, Ark., moved northeast one mile south of that town, and passed into Marion county. A funnel-shaped cloud was observed, and what appeared to be a ball of fire was attached to the front of the funnel. The track was narrow, about 50 yards in width, and heavy hail fell in places. Three persons were killed, about 50 injured, and great destruction of property was reported. At Olympia, Wash., heavy rain and high wind continued from the 16th to the 19th. On the 18th 3.20 inches of rain fell in 12 hours, flooding the streets.

**17th.**—Destructive wind and rain storms occurred in the Ohio, Mississippi, and lower Missouri valleys and Tennessee, and heavy gales prevailed over the Great Lakes. A heavy thunderstorm from the west passed about 2 miles north of Bryan, Ohio, at 1 a. m. After an interval or lull of one hour the storm appeared to come back. The wind increased from the northwest, and the thunder came nearer and nearer until the storm passed to the westward of Bryan, when the wind shifted to southwest. Thunder was heard in the northwest until 7 a. m.

A well-defined tornado visited Red Bud, Ill., 36 miles south-southeast of Saint Louis, Mo., about 4 a. m., killing 2 persons, injuring 7, and destroying 82 buildings. The storm moved northeast by east in a path 50 to 500 yards in width. Owing to the early hour accurate observations of the storm's formation and characteristics were not made. Its passage was attended by heavy thunder and vivid lightning, and was preceded by heavy rain and followed by hail. The first building damaged was 3 miles west-southwest of Red Bud, and the last building damaged was located in the northeast part of the town. Debris lay in a confused mass in the track of the storm; trees, timbers, etc., fell towards the center of the track. At 4 a. m. a thunderstorm, with heavy rain and hail, moved northeast over Fayetteville, Ill. Between 4 and 5 a. m. a thunderstorm, with heavy rain and hail, moved northeast over Salem, Ill.; damage was caused by hail, and a church steeple was blown down. High wind caused damage at Olney and McLeansboro, Ill. A thunder and hail storm moved northeast over New Memphis, Ill., about 3 a. m. High southwest winds in the afternoon caused damage of a minor character at Toledo, Ohio. At Detroit, Mich., a moderate thunderstorm, with heavy rain at intervals, occurred in the early morning. In the afternoon a gale set in from the southwest and continued until the early morning of the 8th; a number of casualties were reported on the Lakes.

At Dubuque, Iowa, a gale from the northwest, with snow, set in in the afternoon and continued until after midnight; the damage by snow and wind was estimated at \$10,000. At Davenport, Iowa, rain changed to snow 11.30 a. m., and snow continued until evening, with high northwest winds; damage was caused to electric wires. At Mechanicsville, Iowa, a west gale, with sleet and snow, prevailed all day. A thunderstorm of unusual severity occurred at Saint Louis, Mo., at 4 a. m.; the pressure decreased .17 inch from 1.30 to 4 a. m.; rain fell; and strong westerly winds, with snow, prevailed in the afternoon. At Springfield, Mo., a thunderstorm, with high southwest wind and rain, occurred in the morning; the wind veered to west and continued high all day, with snow in the afternoon.

At Kansas City, Mo., rain changed to snow 7.35 a. m., with high northwest winds; trains from the east were delayed, and electric wires were broken by heavy snow. At Little Rock, Ark., westerly winds reached a velocity of 48 miles per

hour at 2.34 p. m. High southwest wind caused damage at Vicksburg, Miss. At Water Valley, Miss., a severe wind and rain storm, lasting 5 minutes, occurred 9 a. m.; frail buildings were blown down. A destructive storm occurred 6 miles southwest of Marksville, La., from 8.40 to 9.10 a. m.; buildings were damaged. At Memphis, Tenn., a thunderstorm prevailed from 5.15 to 10.40 a. m. The thunderstorm was followed by high wind which reached a velocity of 50 miles per hour at 1.05 p. m., and ended 5.30 p. m.

**17th-23d.**—A heavy rain storm prevailed over western Washington; streams overflowed their banks; bridges were carried away; and washouts occurred on the principal railroad lines.

**18th.**—High wind and rain prevailed over the New England and middle Atlantic states. At Strafford, Vt., buildings were blown down and unroofed. Frail buildings were blown down in Massachusetts and Connecticut. Trees were uprooted by wind at Rondout, N. Y. High wind, with snow, prevailed over the lower lakes. High wind and heavy rain caused some damage in New Jersey and Delaware. At Harrington, Del., a storm moved northeast at 12.25 p. m., destroying buildings, etc., in a path 150 to 200 feet in width. Heavy gales were encountered on Chesapeake Bay. At Baltimore, Md., the wind changed from southeast to northwest and reached a velocity of 42 miles per hour, causing considerable damage to buildings. At Norfolk, Va., a wind squall, with moderate rain, moved east, causing damage to the extent of about \$2,000. At Pysht, Wash., heavy rain and high northeast winds prevailed; streams were very high, and some damage was caused by flood. At Tatoosh Island, Wash., east winds reached a velocity of 60 miles per hour. On the 19th the wind shifted to south, with heavy rain. The ship "Ericsson," from San Francisco, was wrecked on Entrance Island, Vancouver Island.

**20th.**—A report from Seattle, Wash., stated that heavy rain had caused the overflow of streams in King, Pierce, and Snohomish counties, and that the floods were general throughout western Washington.

**23d.**—High winds prevailed over Nevada. At Carson City, Nev., a wind velocity of 42 miles per hour was reached in the early morning. A few buildings at Downeyville, Nev., were wrecked by high wind.

**24th.**—A storm of wind and snow, with low temperature, prevailed in the Northwest. At Omaha, Nebr., sleet rendered the streets almost impassable. At Salt Lake City, Utah, a west gale prevailed, and nearly eight inches of snow fell.

Damage to buildings was caused by high wind at Deseret, Utah. A northwest gale prevailed in the evening at Los Angeles, Cal.

**25th.**—A severe wind and snow storm continued in the Northwest. During a southeast gale a schooner was stranded near Milwaukee, Wis.; the crew was saved by the Life Saving Service; the cargo was lost.

**26-30th.**—Exceptionally severe and persistent wind and rain storms prevailed over the greater part of California. At Newcastle and Orangeville one-tenth and one-fourth, respectively, of the orange crop was reported blown from the trees. At Eureka, Cal., the storm set in with great violence the early morning of the 27th; heavy wind and rain squalls caused great damage in the surrounding country. At Blocksburg, Cal., 90 miles southeast of Eureka, the storm was very severe, with thunder and lightning, hail, rain, and snow; trees were blown down, and streams were flooded. At Red Bluff, Cal., southeast gales and rain from the 27th to 30th flooded streets.

At San Francisco, Cal., the storm continued from the 27th to the 30th, and on the 30th the wind reached a velocity of 56 miles per hour from the southeast, the highest velocity ever recorded at that station. At Sacramento, Cal., the wind reached a velocity of 45 miles per hour, with an extreme velocity of 54 miles on the 27th. At Portland, Oregon, a southwest gale, with rain, continued from the 27th to 29th. At Fresno, Cal., a gale and sandstorm prevailed from the 28th to 30th; trees and sheds were blown down. At Los Angeles, Cal., rain and high wind prevailed on the 28th; trees were prostrated, and cellars were flooded.

**27th.**—At Block Island, R. I., a heavy northeast gale began 5.50 a. m. and continued until the afternoon of the 30th; heavy rain fell; high tides occurred on the 29th and 30th; and the wind reached a velocity of 70 miles per hour on the 29th. At Detroit, Mich., heavy, moist snow damaged electric wires.

**28th.**—At Boston, Mass., a rain, sleet, and snow storm, with high wind, prevailed from the 28th to the 30th. At Rapid City, S. Dak., a "chinook" wind prevailed from the southwest from 4.30 p. m.

**29th.**—A gale, with snow, prevailed along the New England coast and over Long Island. The storm continued over Long Island Sound until the 30th, with wind shifting to northwest. On the 30th dredges were sunk off Newport, R. I., and a bark went ashore at Highland Light, Mass.

## INLAND NAVIGATION.

### FLOODS.

On the 10th the Tennessee River rose rapidly at Chattanooga, Tenn., causing considerable damage to dams, etc., of the United States Engineer Corps on the lower river. On the 11th the river continued to rise and navigation was resumed. On the 15th and 16th a freshet in the Raritan River caused considerable damage at New Brunswick, N. J.; a temporary bridge at the foot of Albany street was washed away. Meadows about Hoboken, N. J., were reported under water. Heavy rain from the 18th to the 20th flooded streams between the Cascade Mountains and Puget Sound, Wash. A number of towns were inundated, railroad traffic was interrupted by washouts and landslides, and several fatalities were reported. At Sacramento, Cal., the Sacramento River rose 10.8 feet from the 27th to the 30th.

### ICE IN RIVERS AND HARBORS.

*Mississippi River.*—At Saint Paul, Minn., the river was frozen on the 26th. At Red Wing, Minn., the river was full

of floating ice and navigation was practically closed for the season on the 21st; 23d, ice increased in quantity; 24th, river frozen over; 25th, Lake Pepin frozen and persons crossing on the ice; 27th, persons crossing on the ice from Wisconsin. At Dubuque, Iowa, the river was frozen and navigation closed for the season on the 25th. At Keokuk, Iowa, ice was running in the river and navigation was closed on the 23d.

*Missouri River.*—At Fort Buford, N. Dak., thin running ice was reported on the 16th; 21st, river full of ice; 24th, river closed by ice. At Bismarck, N. Dak., the river was frozen on the 21st. At Fort Stevenson, N. Dak., the river was frozen on the 24th. At Yule, N. Dak., the Little Missouri was closed on the 19th, and on the 21st the Little Missouri was closed by ice at Medora, N. Dak. At Pierre, S. Dak., the east channel was closed and the west channel was full of drift ice on the 21st. Saint Joseph, Mo., running ice was reported on the 24th; and at Oregon and Kansas City, Mo., floating ice was reported during the third decade of the month.